CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE SOUTH FORK HOLSTON RIVER WATERSHED

4.1. BACKGROUND. This chapter is organized by HUC-10 subwatershed, and the description of each subwatershed is divided into four parts:

i. General description of the subwatershed
ii. Description of point source contributions
ii.a. Description of facilities discharging to water bodies listed on the 2002 303(d) list
iii. Description of nonpoint source contributions

There is one HUC 10-digit subwatershed in the Tennessee portion of the Group 3 portion of the Tennessee portion of the Holston River Watershed (HUC 06010102).

Information for this chapter was obtained from databases maintained by the Division of Water Pollution Control or provided in the WCS (Watershed Characterization System) data set. The WCS used was version 2.0 (developed by Tetra Tech, Inc for EPA Region 4) released in 2003.

WCS integrates with ArcView® v3.x and Spatial Analyst® v1.1 to analyze user-delineated (sub)watersheds based on hydrologically connected water bodies. Reports are generated by integrating WCS with Microsoft® Word. Land Use/Land Cover information from 1992 MRLC (Multi-Resolution Land Cover) data are calculated based on the proportion of county-based land use/land cover in user-delineated (sub)watersheds. Nonpoint source data in WCS are based on agricultural census data collected 1992–1998; nonpoint source data were reviewed by Tennessee NRCS staff.

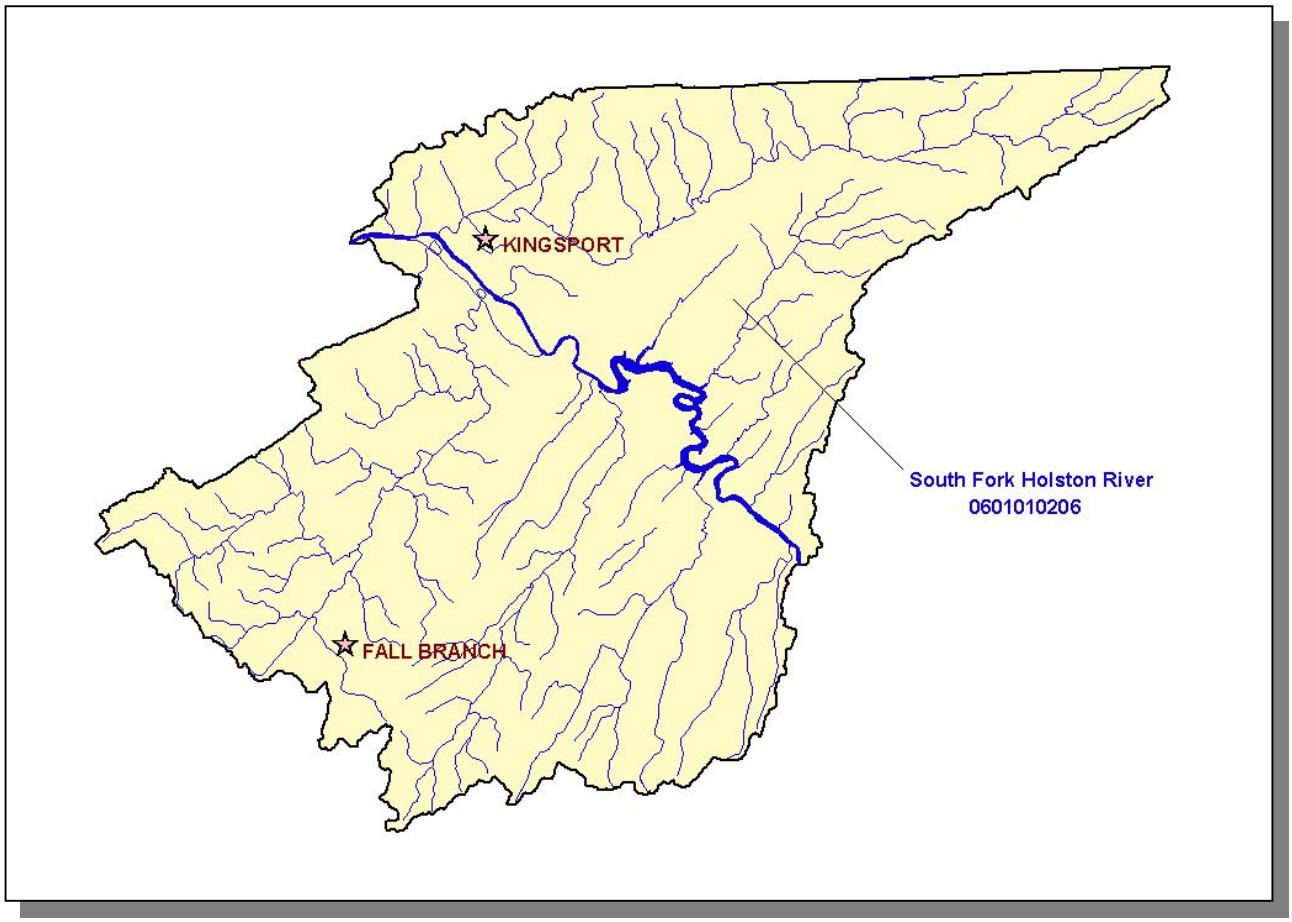

Figure 4-1. The Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed is Composed of one USGS-Delineated Subwatershed (10-Digit Subwatersheds). *Locations of Fall Branch and Kingsport are shown for reference.*

4.2. CHARACTERIZATION OF HUC-10 SUBWATERSHEDS. The Watershed Characterization System (WCS) software and data sets provided by EPA Region IV were used to characterize each subwatershed in the Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed.

HUC-10	HUC-12
0601010206	060101020601 (Fort Patrick Henry Lake)
	060101020602 (South Fork Holston River)
	060101020603 (Horse Creek)
	060101020604 (Reedy Creek)

Table 4-1. HUC-12 Drainage Areas are Nested Within HUC-10 Drainages. *NRCS worked with USGS to delineate the HUC-10 and HUC-12 drainage boundaries.*

4.2.A. 0601010206 (South Fork Holston River).

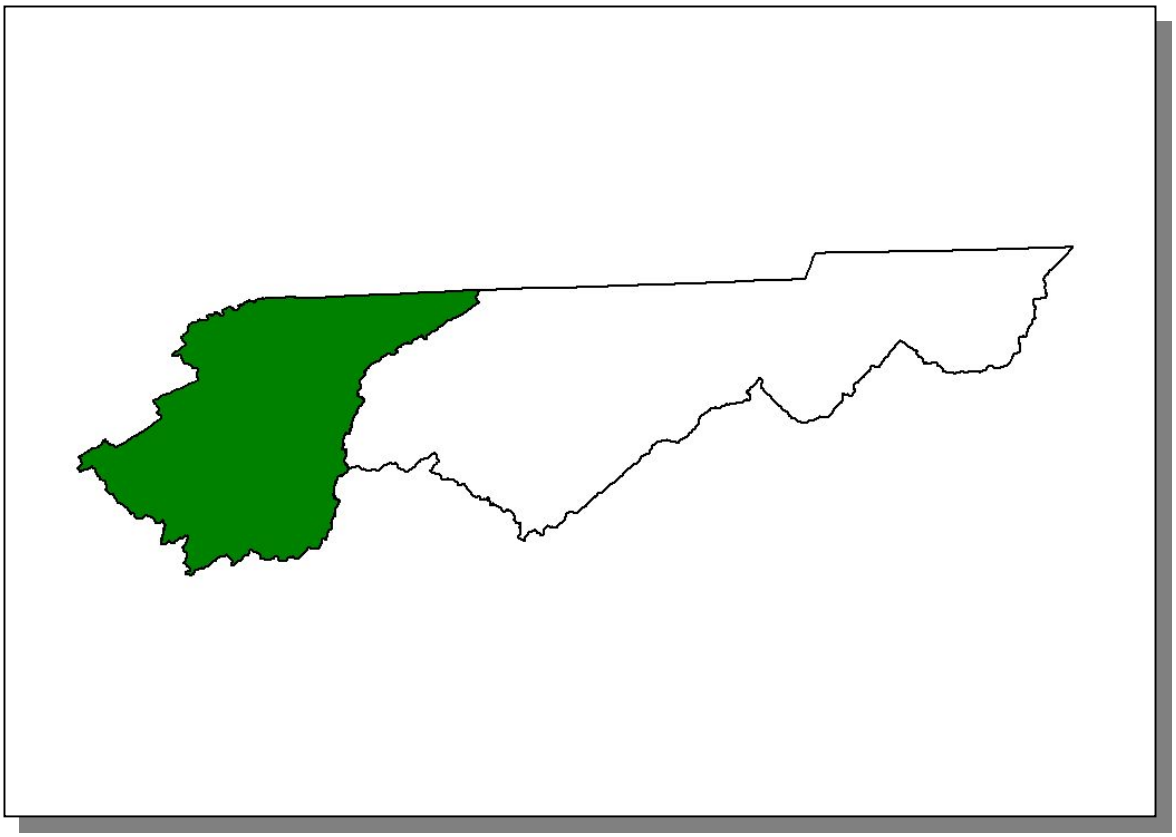

Figure 4-2. Location of the Group 3 Portion of the Tennessee Portion of the Subwatershed 0601010206. *The entire South Fork Holston River Watershed (HUC 8) boundary in Tennessee is shown for reference.*

4.2.A.i. General Description.

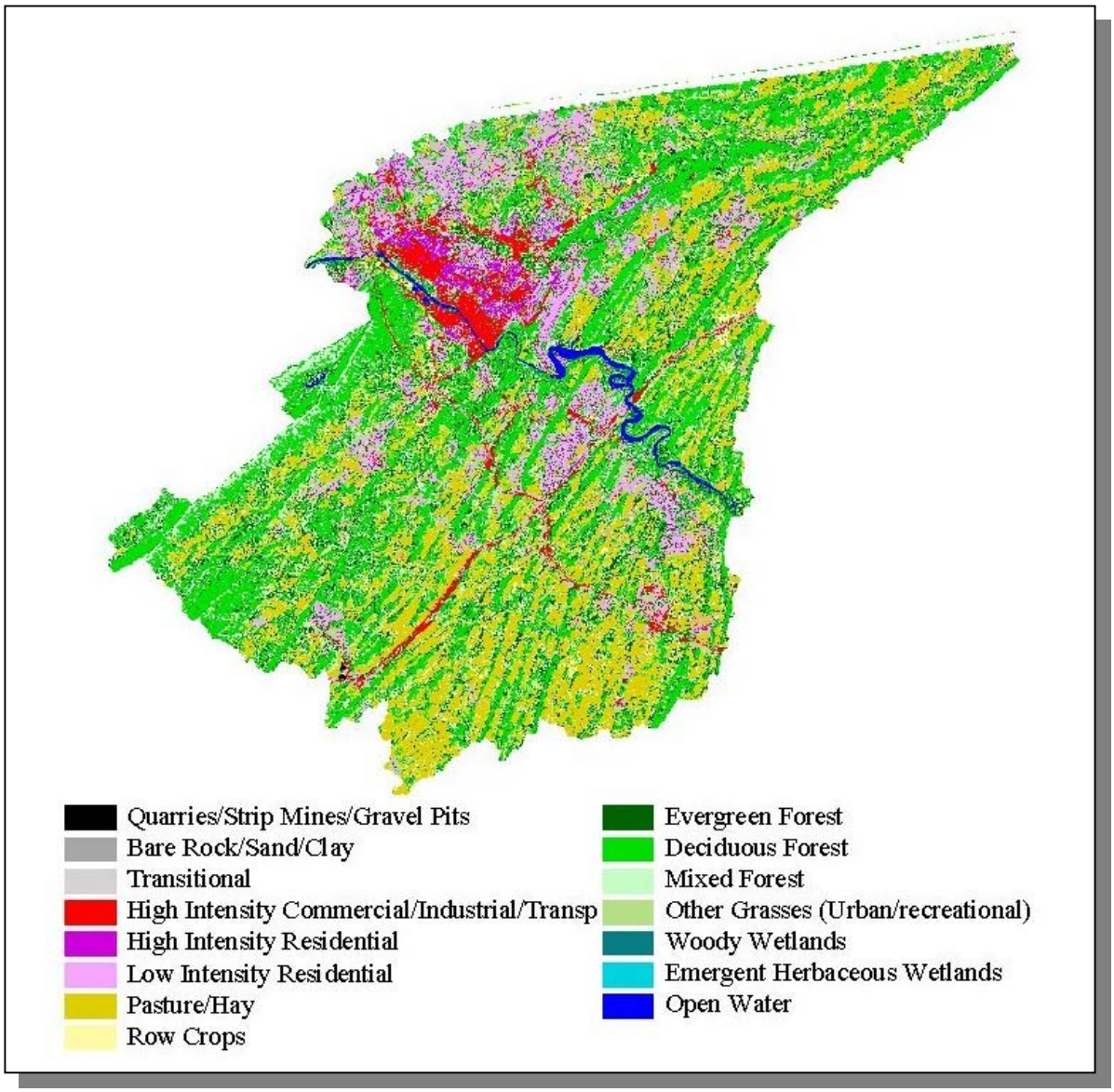

Figure 4-3. Illustration of Land Use Distribution in Subwatershed 0601010206.

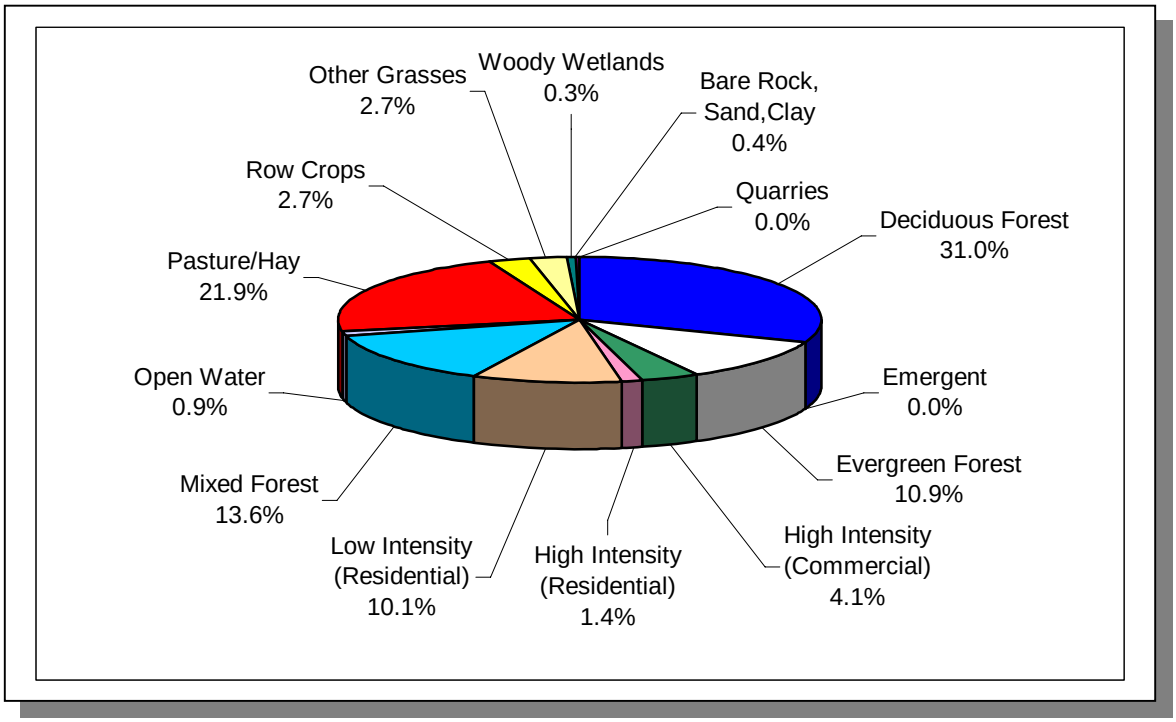

Figure 4-4. Land Use Distribution in Subwatershed 0601010206. *More information is provided in Appendix IV.*

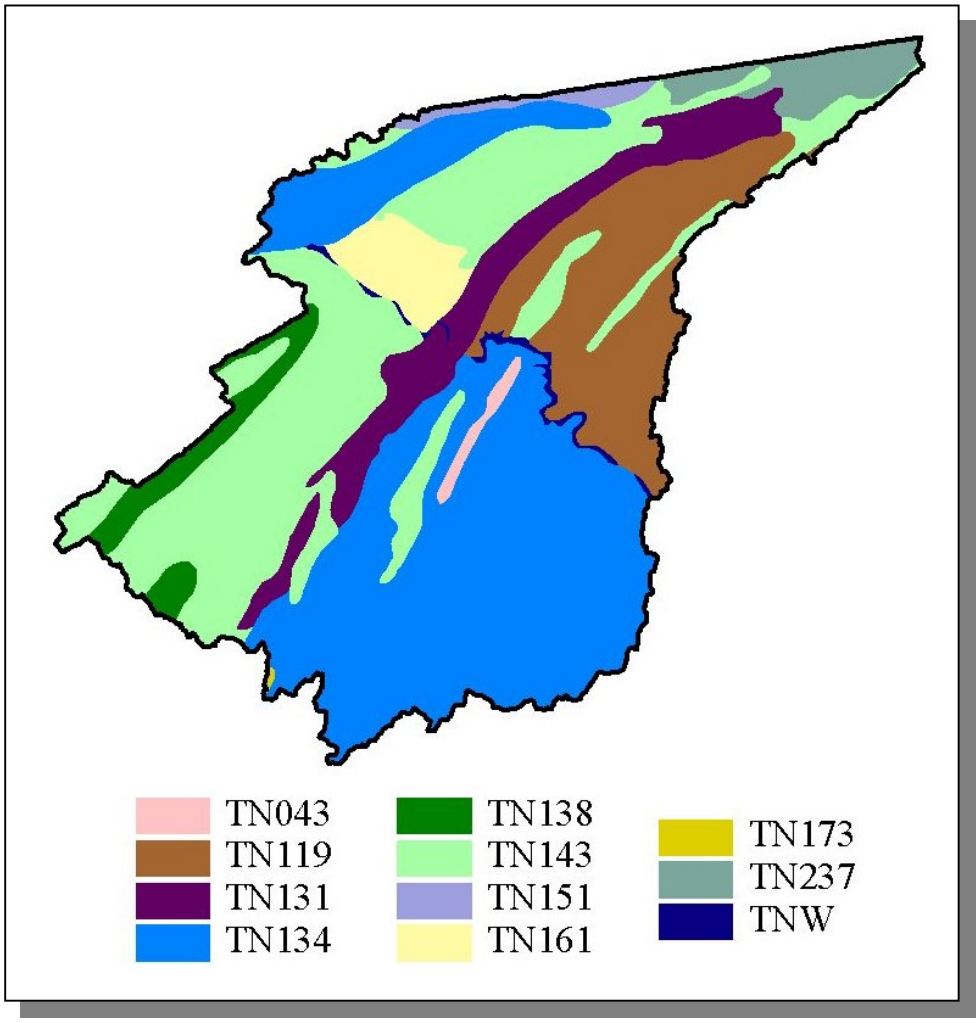

Figure 4-5. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0601010206.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN043	0.00	C	2.70	5.02	Loam	0.30
TN119	0.00	C	1.08	5.15	Loam	0.33
TN131	0.00	C	1.17	4.95	Silty Loam	0.33
TN134	0.00	B	1.38	5.18	Loam	0.31
TN138	0.00	C	2.48	4.26	Sandy Loam	0.22
TN143	0.00	C	1.22	6.44	Loam	0.32
TN151	0.00	C	2.88	4.75	Loam	0.40
TN161	6.00	C	1.41	5.11	Loam	0.31
TN173	0.00	C	0.56	2.26	Loam	0.14
TN237	0.00	B	3.36	5.40	Silty Loam	0.32

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0601010206. *More details are provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-1997)
Greene	55,853	59,369	62,909	0.09	53	56	60	13.2
Hawkins	44,565	48,821	53,563	0.37	166	182	200	20.5
Sullivan	143,596	150,371	153,048	33.8	48,540	50,831	51,736	6.6
Washington	92,315	101,368	107,198	13.6	12,558	13,789	14,582	16.1
Totals	**336,329**	**359,929**	**376,718**		**61,317**	**64,858**	**66,578**	**8.6**

Table 4-3. Population Estimates in Subwatershed 0601010206.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Johnson City	Washington	273	123	21	101	1
Kingsport	Sullivan	14,939	6,542	5,833	695	14
Totals		**15,212**	**6,665**	**5,854**	**796**	**15**

Table 4-4. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0601010206.

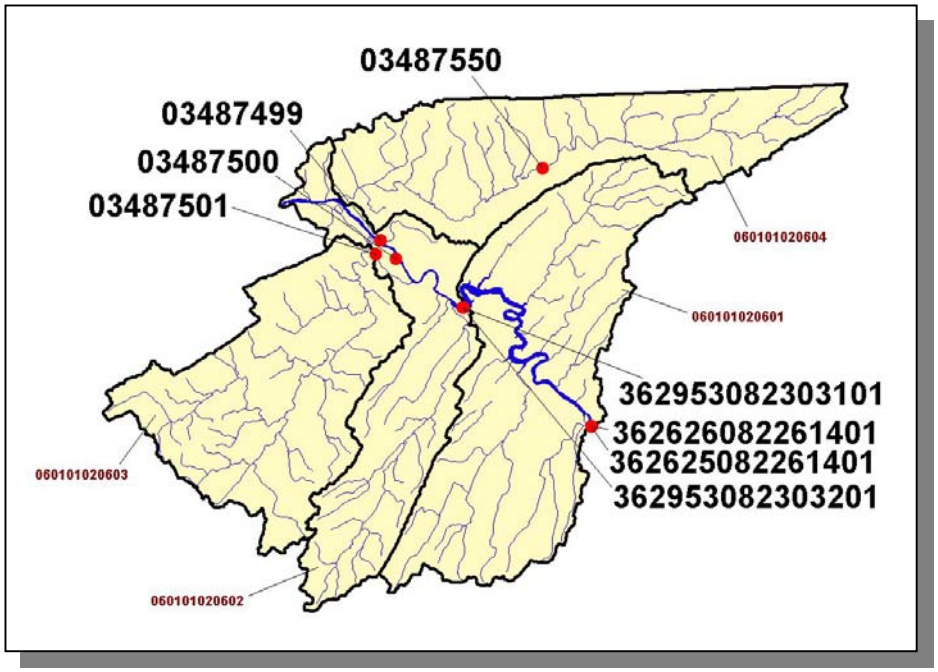

Figure 4-6. Location of Historical Streamflow Data Collection Sites in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.*

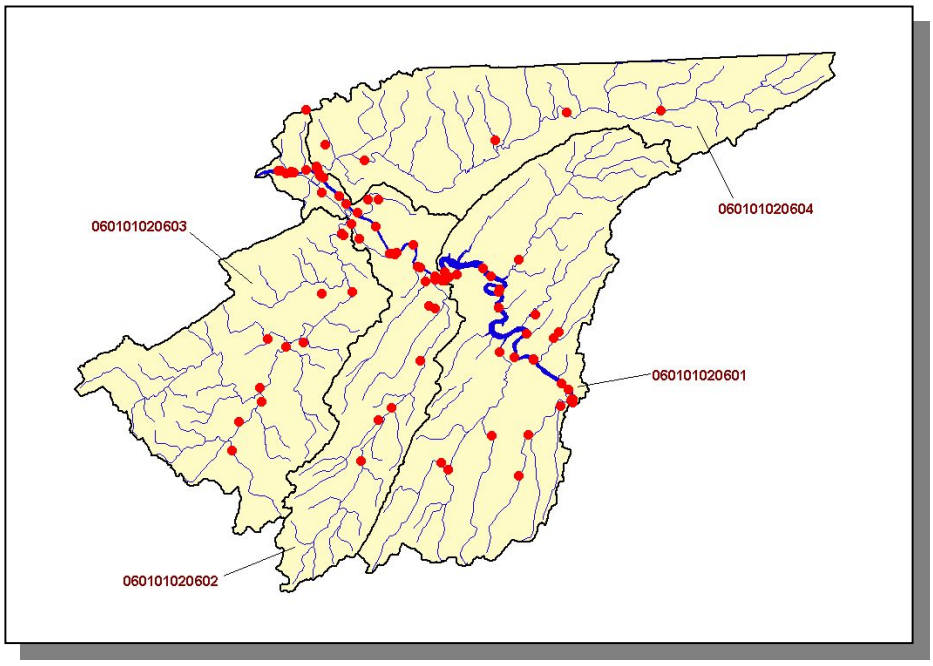

Figure 4-7. Location of STORET Monitoring Sites in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.*

4.2.A.ii Point Source Contributions.

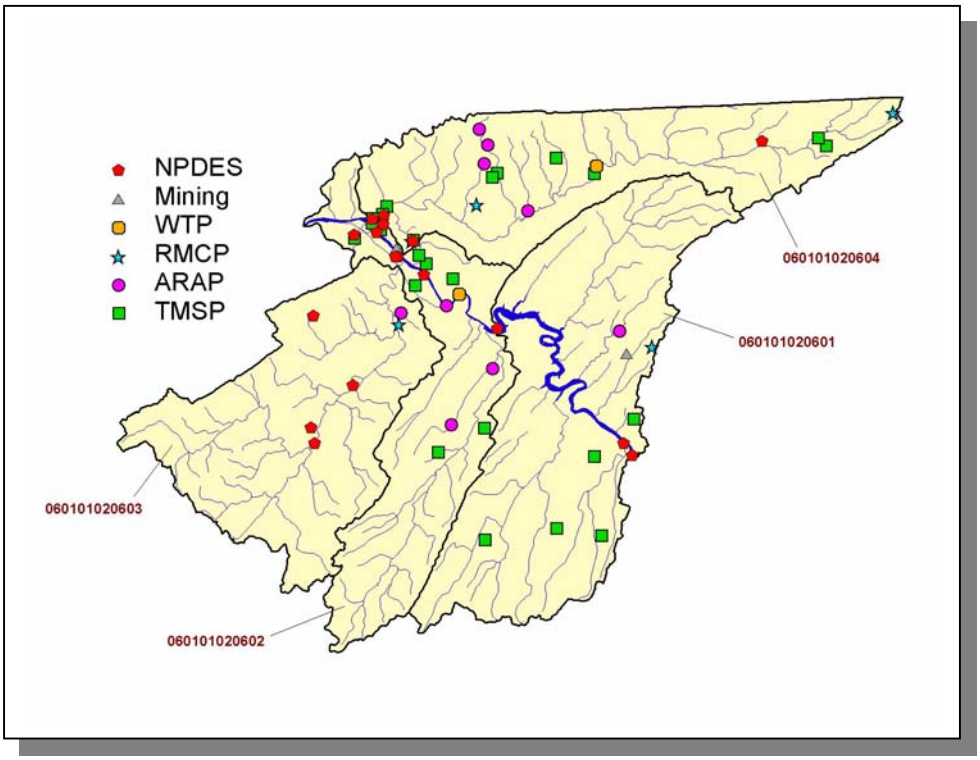

Figure 4-8. Location of Active Point Source Facilities in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

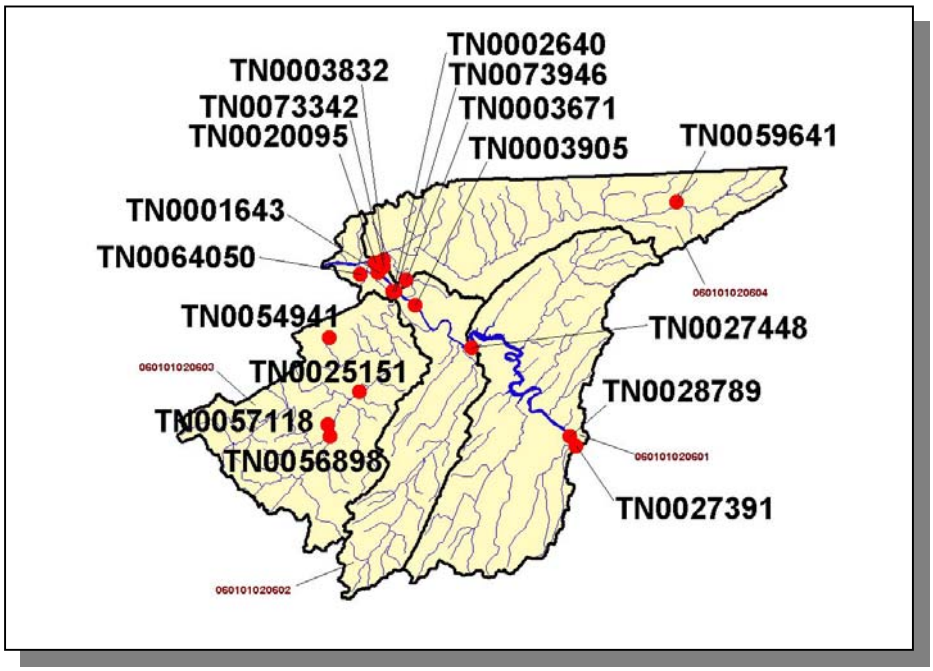

Figure 4-9. Location of NPDES Facilities in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

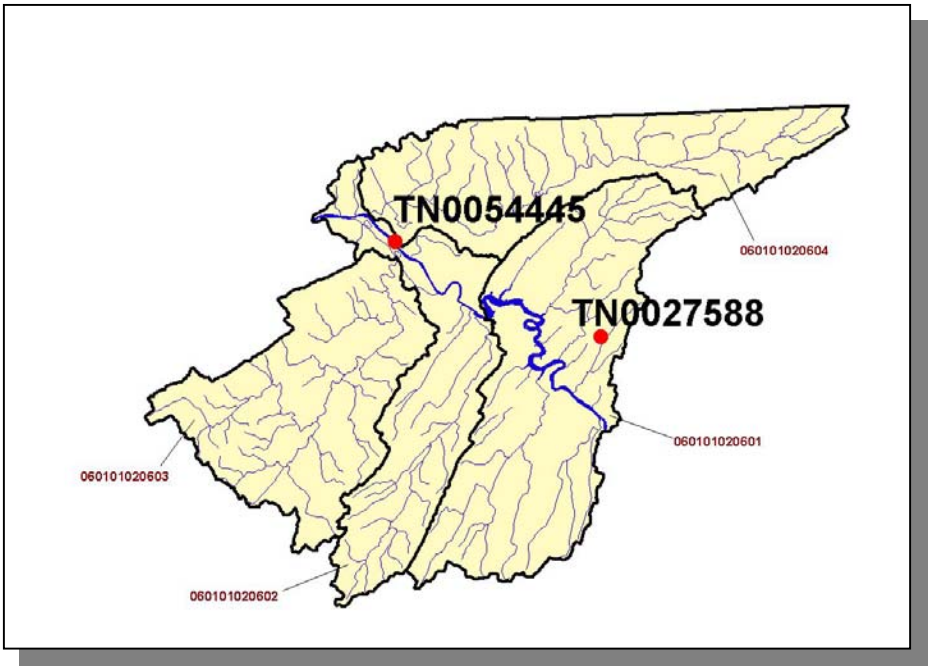

Figure 4-10. Location of Active Mining Facilities in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

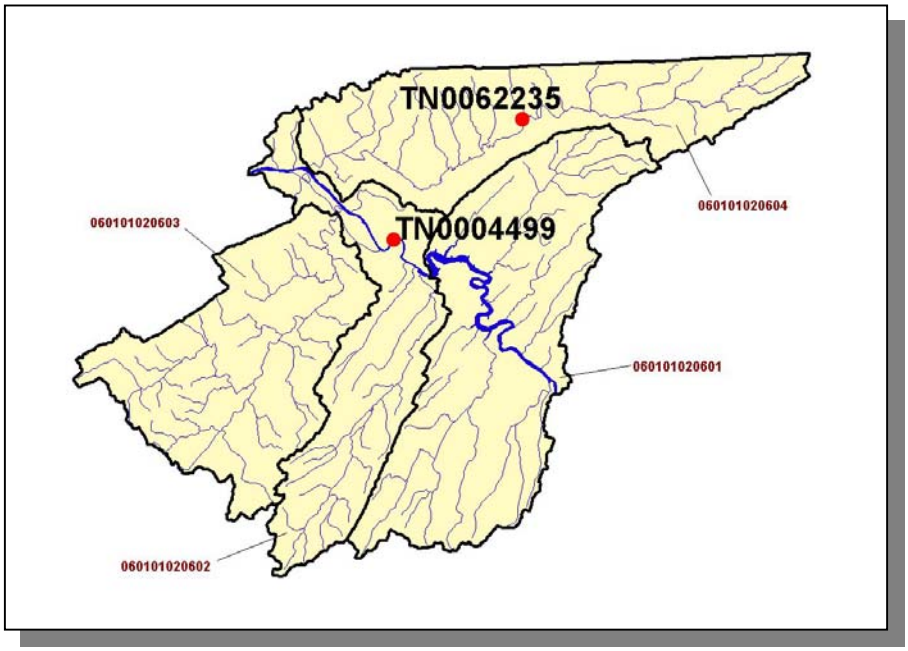

Figure 4-11. Location of Water Treatment Plants in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

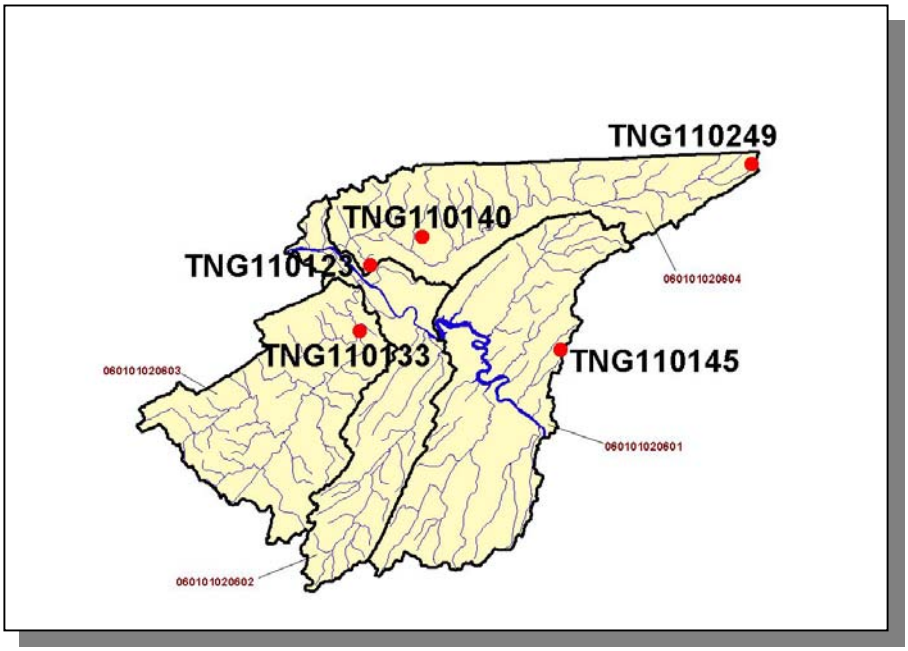

Figure 4-12. Location of Ready Mix Concrete Plants in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

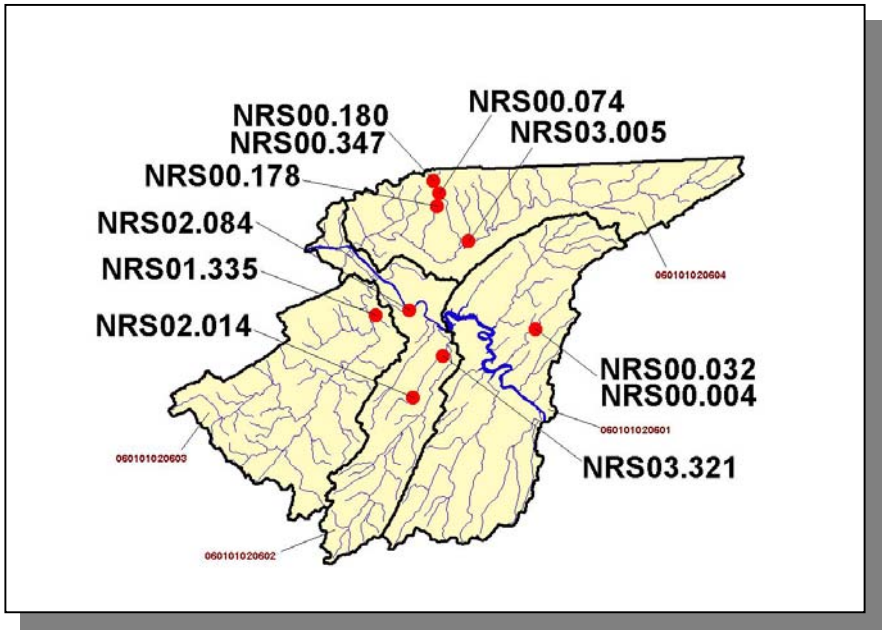

Figure 4-13. Location of ARAP Sites (Individual Permits) in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

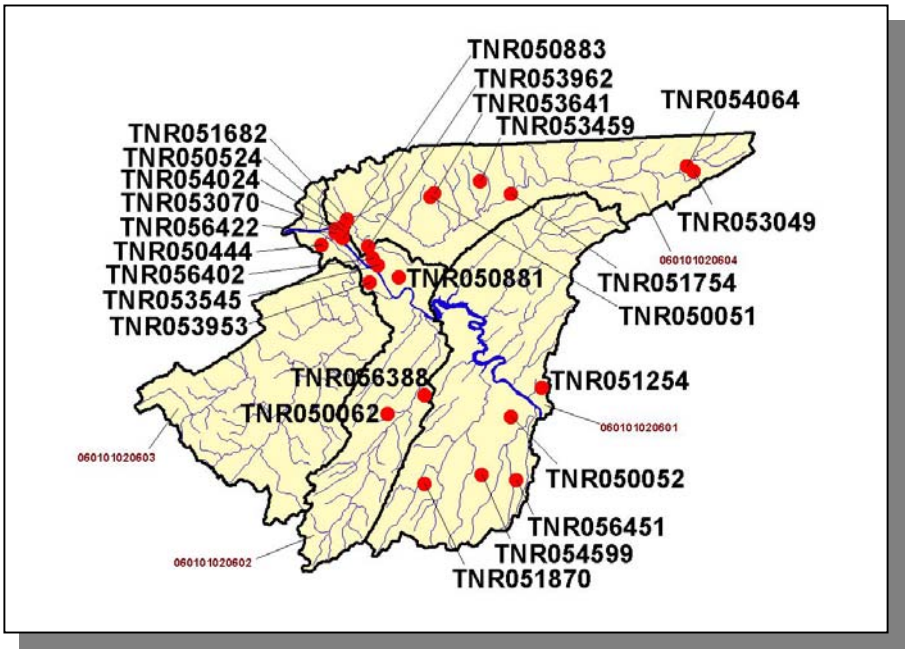

Figure 4-14. Location of TMSP Facilities in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

4.2.A.ii.a. Dischargers to Water Bodies Listed on the 2002 303(d) List

There are ten NPDES facilities discharging to water bodies listed on the 2002 303(d) list in Subwatershed 0601010206:

- TN0027448 (TVA Fort Patrick Henry Hydro Plant) discharges to Holston River @ RM 8.1
- TN0003905 (AFG Industries) discharges to South Fork Holston River @ RM 2.3 and Madd Branch to South Fork Holston River @ RM 4.3
- TN0003671 (BAE Systems Ordinance) discharges to South Fork Holston River, Holston River, and Madd Branch
- TN0073946 (Eastman Chemical Company B-280 Office Complex) discharges to Storm Sewer to South Fork Holston River
- TN0002640 (Tennessee Eastman Division) discharges to South Fork Holston River @ RM 142.2, Big Sluice of South Fork Holston River, and Horse Creek
- TN0003832 (Quebecor Printing) discharges to Storm Sewer to Reedy Creek @ RM 0.5
- TN0073342 (CEMEX, Inc.) dischages to Ditch to South Fork Holston River @ RM 2.5
- TN0001643 (Weyerhaeuser Company) discharges to South Fork Holston River @ RM 2.3
- TN0020095 (Kingsport STP) discharges to South Fork Holston River @ RM 2.2
- TN00645050 (Portola Packaging) discharges to South Fork Holston River Sluice @ RM 0.4

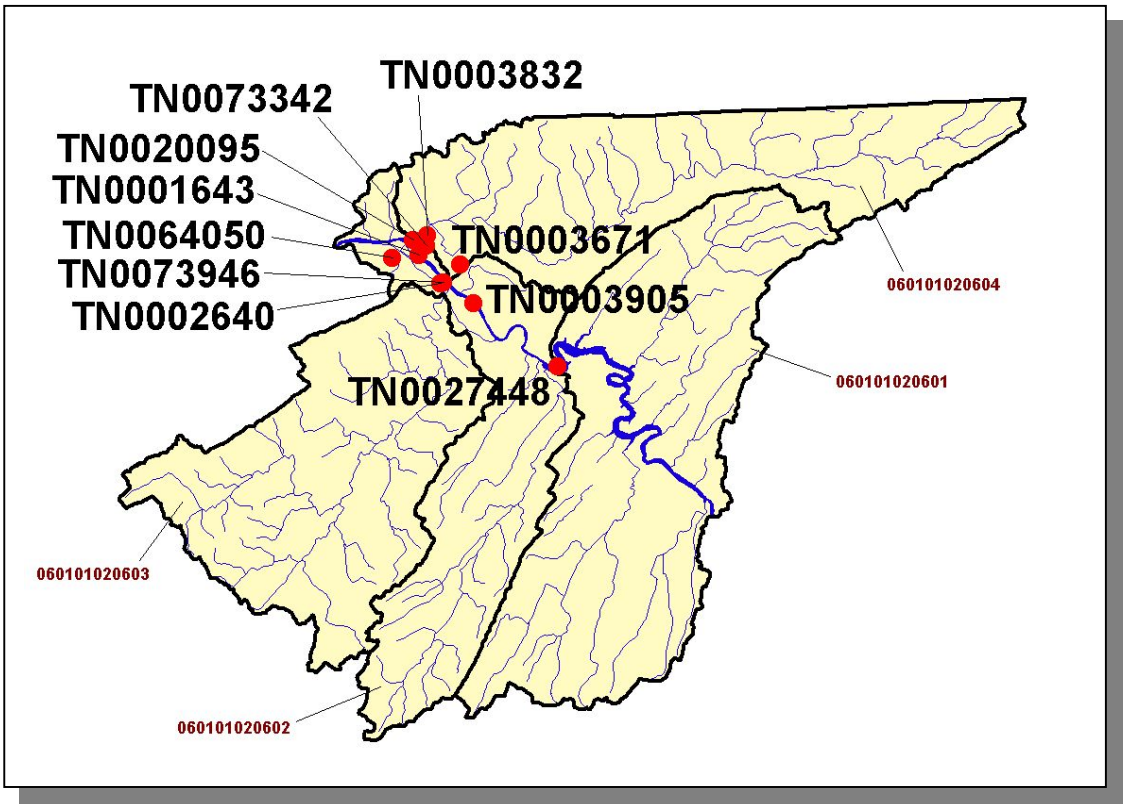

Figure 4-15. Location of NPDES Dischargers to Water Bodies Listed on the 2002 303(d) List in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

PERMIT #	1Q10	3Q10	7Q10	3Q20	QDESIGN
TN0027448	441	469	494	444	
TN0003905	396	433	550	382	0.45/0.35
TN0003671	396	433	550	382	
TN0073946	441	469	494	444	
TN0002640	396	433	550	382	
TN0003832	4.73	5.20	5.52	3.16	
TN0073342	396	433	550	382	
TN0001643	396	433	550	382	
TN0020095	396	433	550	382	12.4
TN0064050	396	433	550	382	

Table 4-5. Receiving Stream Flow Information for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206. *Data are in million gallons per day (MGD). Data were obtained from the USGS publication Flow Duration and Low Flows of Tennessee Streams Through 1992 or from permit files.*

PERMIT #	TSS	OIL and GREASE	pH	Zn	COD
TN003905	X	X			
TN0003671			X		
TN0003671	X				
TN0002640	X		X	X	
TN0003832					X

Table 4-6. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206. *TSS, Total Suspended Solids; COD, Chemical Oxygen Demand.*

PERMIT #	WET	$CBOD_5$	COD	NH_3	NO_3	TRC	TSS	TDS	SETTLEABLE SOLIDS	CN	P	DO	pH
TN0027448							X						
TN0003905						X	X						X
TN0003671	X	X	X	X	X	X	X		X	X		X	X
TN0073946						X	X						X
TN0002640	X	X		X		X	X			X			X
TN0003832	X	X				X	X						X
TN0073342						X	X						X
TN0001643	X	X		X			X	X			X		
TN0020095		X				X	X		X			X	X
TN0064050						X							X

Table 4-7. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206. *WET, Whole Effluent Toxicity; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids; COD, Chemical Oxygen Demand; TDS, Total Dissolved Solids.*

PERMIT #	Al	Cr	Cu	Pb	Ni	Zn	Fe
TN0003905	X						
TN0003671		X	X	X	X	X	
TN0002640		X	X	X	X	X	X

Table 4-8. Metals Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206.

PERMIT #	FECAL COLIFORM	*E. COLI*
TN0003671	X	X
TN0020095	X	X

Table 4-9. Pathogens Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206.

PERMIT #	OIL and GREASE	PCB
TN0027448		X
TN0003905	X	
TN0003832	X	
TN0073342	X	

Table 4-10. Organic Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206.

4.2.A.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
12,460	28,189	2,123	25	48,458	127	141

Table 4-11. Summary of Livestock Count Estimates in Subwatershed 0601010206. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Greene	180.0	171.8	2.0	10.5
Hawkins	177.4	177.4	0.4	2.1
Sullivan	123.7	123.7	0.1	0.3
Washington	54.8	50.3	0.3	0.2
Total	**535.9**	**523.2**	**2.8**	**13.1**

Table 4-12. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 0601010206.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.18
Legumes (Hayland)	0.16
Grass (Hayland)	0.42
Grass, Forbs, Legumes (Mixed Pasture)	1.61
Forest Land (Not Grazed)	0.00
Forest Land (Grazed)	0.00
Corn (Row Crops)	8.20
Tobacco (Row Crops)	3.62
Non-Agricultural Land Use	0.00
Other Land in Farms	0.02
Farmsteads and Ranch Headquarters	0.32

Table 4-13. Annual Estimated Total Soil Loss in Subwatershed 0601010206.